REMARKS

This Amendment is in response to the Office Action of December 24, 2003. In the Office Action, the Examiner indicated that Claims 1-19 are pending and rejected in a continued examination under 37 CFR 1.114. With this Amendment, Claims 1, 13 and 19 are amended and Claims 1-19 are presented for reconsideration and allowance.

Claim Rejection - 35 USC § 112 second paragraph

The Examiner rejected Claims 1-19 under 35 U.S.C. 112, second paragraph, as indefinite. The Examiner considered that a phrase in the independent claims "a combination of a Young's Modulus ... with magnetic media at high temperatures" is considered indefinite since it is not readily apparent what "combination" of the recited components would produce the claimed result, i.e., "pulls the transducer back away from the magnetic media to avoid contact with magnetic media at high temperatures." The Examiner also considered it not readily apparent what constitutes a high temperature, since "high" is a relative term, and the magnetic media is not part of a head so therefore would not be encompassed by the claim.

With this amendment, the independent claims 1, 13 and 19 are amended to recite "high head temperatures." With this amendment, it is definite that the temperature referred to is a temperature of the head (which is encompassed by the claim) and not, as suggested by the Examiner, possibly a temperature of the magnetic media.

In some grammatical sense, the term "high temperatures", taken out of context, may be merely a relative term and indefinite as suggested by the Examiner. But taken in the context of disc drive design in the present application, a person of ordinary skill would have in mind a particular intended operating range for a particular design, with the term "high temperatures"

referring to the highest or hottest temperatures in that intended operating range.

In prior art U.S. Patent 6,078,455 Enarson et al., for example, a disc drive design is taught in which a temperature sensor is placed in proximity to the heads and three different operating temperature ranges are defined as less than 15 degrees Celsius (cold), 15 to 45 degrees Celsius (ambient) and above 45 degrees Celsius (hot). Enarson also teaches that "Other temperature ranges could be readily established (Enarson et al. column 5, lines 25-32). In another prior art disc drive design taught in U.S. Patent 5,801,902 Koeppel et al., one example shows operating temperatures from -10 to 70 degrees C., and another example shows operating temperatures from -40 to 70 degrees C.(Koeppel et al., tables at column 5, lines 43-62). The terms "high temperatures" or "high head temperatures" would thus readily be understood as temperatures near a high end of an operating range for a disc drive design and not indefinite under 35 U.S.C. 1112, second paragraph.

Once the examples shown in the present disclosure are disclosed to a person of ordinary skill in the art, other combinations of "Young's Modulus, a Poisson's ratio and a thickness such that the first restraint layer pulls the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures" can readily be found. A person of ordinary skill can develop additional combinations without undue experimentation using known thermal stress design techniques.

For example, McGraw Hill Encyclopedia of Science and Technology, Vol. 18, page 271 (McGraw-Hill, Inc. 1987, ISBN 0-07-079292-5) includes an entry on "Thermal Stress" (attached) which teaches:

Thermal Stress

Mechanical stress induced in a body when some or all

> of its parts are not free to expand or contract in response to changes in temperature. In most continuous bodies, thermal expansion or contraction cannot occur freely in all directions because of geometry, external constraints, or the existence of temperature gradients, and so stress is produced. Such stresses caused by a temperature change are known as thermal stresses....
>
> The method of solving these problems is to formulate the complete problem and then to simplify it by making assumptions based on the physical situation or on experimental data. From this simplified formulation, one obtains an analytic solution that identifies the basic parameters of the problem and then constructs charts showing how the stresses vary with these parameters. The solution is then refined by examining the simplifying assumptions and obtaining correction factors. In most cases, this procedure yields results sufficiently accurate for use in the design of structures-for high-temperature applications.

The "basic parameters of the problem" referred to above are disclosed in the present application as temperature, restraint layer thickness, Young's modulus and Poisson's ratio.

With the availability of computer-aided design software, multiple iterations of designs using such thermal stress design techniques can be rapidly generated automatically and the results in terms of pulling back the transducer can be numerically evaluated to automatically converge on a range of workable solutions for the intended temperature range. The examples disclosed in the present application provide starting points for such computer-aided design activity, and no further invention or undue experimentation would be required to generate a range of working designs with different materials.

Since the independent claims 1, 13, 19 now specify definite high head temperatures that are defined by the operating temperature range of the disc drive design, and the methods of performing thermal designs are known to those skilled in the art as reported in the McGraw-Hill Encyclopedia, Claims 1-19 are believed to meet the definiteness requirements of 35 USC 112, second paragraph. Reconsideration and withdrawal of the rejection

of Claims 1-19 under 35 USC 112, second paragraph is therefore requested.

Claim Rejection - 35 USC § 112 first paragraph

The Examiner rejected Claims 1- 19 under 35 U. S. C. 112, first paragraph. The Examiner considered the specification, while being enabling for the embodiments shown, to not reasonably provide enablement for an unlimited combination of materials and thicknesses, and also the higher temperatures.

As discussed above, the independent claims 1, 13 and 19 are amended to recite "high head temperatures." Also as discussed above in connection with Enarson et al. and Koeppel et al., the "high temperatures" would be known to a person of ordinary skill in the art for a particular magnetic drive design. Also as discussed above, the McGraw-Hill Encyclopedia shows that the methods for determining combinations of materials other than those shown in the examples are ascertainable using known thermal stress methods.

"If an invention pertains to an art where the results are predictable, e.g., mechanical as opposed to chemical arts, a broad claim can be enabled by disclosure of a single embodiment ... and is not invalid for lack of enablement simply because it reads on another embodiment of the invention which is inadequately disclosed." Spectra-Physics, Inc. v. Coherent, Inc., 827 F.2d 1524, 3 USPQ2d 1737, 1743 (Fed Cir.), cert denied, 484 U.S. 954 (1987).

Moreover, with the availability of computer-aided design software, additional designs can be generated using the examples disclosed as starting points. In this modern design environment, the disclosure is enabling for the full range of combinations encompassed by the claims without undue experimentation.

For these reasons, Claims 1-19 are believed to be enabled by the specification. Reconsideration and withdrawal of the

rejection of Claims 1-19 under 35 USC 112, first paragraph is therefore requested.

Claim Rejections - 35 USC § 102

The Examiner rejected Claims 1-19 under 35 U.S.C. 102(b) over Koshikawa et al (US 5,898,542). The Examiner considered that, with respect to the newly added language to the independent claims, e.g., "a combination of a Young's Modulus ... with magnetic media at high temperatures", and in view of the 112 paragraph 2 rejection, above, that Claims 1-19 were considered to be encompassed by Koshikawa et al.

As explained above in connection with the arguments concerning the 35 USC 112 paragraph 2 rejection, the language "a combination of Young's Modulus, a Poisson's ratio and a thickness such that the first restraint layer pulls the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures" in independent Claims 1, 13 and 19 does set forth a definite limitation under 35 USC 112, second paragraph. When this limitation is considered, the Claims 1-19 are novel relative to Koshikawa et al.

Koshikawa et al. teaches a slider that avoids contact between a read element on the head and thermal asperities on a recording medium by providing a step or protrusion on a leading side of the slider. The step or protrusion is closer to the recording medium than the read element. As pointed out by the examiner, various layers are taught by Koshikawa et al., but Koshikawa et al. does not teach "a combination of Young's Modulus, a Poisson's ratio and a thickness such that the first restraint layer pulls the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures" as presently claimed in Claims 1, 13 and 19. Koshikawa et al. does not teach providing a restraint layer. Koshikawa et al. does not teach any adjustment to a restraint

layer thickness that takes into account Young's Modulus and Poisson's ratio. Koshikawa et al. also does not teach pulling the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures.

Claims 1-19, as presently amended, therefore recite a definite limitation that is not taught in Koshikawa et al. Reconsideration and withdrawal of the rejection under 35 U.S.C. 102(b) over Koshikawa et al. is therefore requested.

The Examiner rejected Claims 1-11, 13-19 under 35 U.S.C. 102(b) as being anticipated by Okai et al. (US 5,687,045). The Examiner considered that, with respect to the newly added language to the independent claims, e.g., "a combination of a Young's Modulus ... with magnetic media at high temperatures", and in view of the 112 paragraph 2 rejection, above, that Claims 1-19 were considered to be encompassed by Okai et al.

As explained above in connection with the arguments concerning the 35 USC 112 paragraph 2 rejection, the language "a combination of Young's Modulus, a Poisson's ratio and a thickness such that the first restraint layer pulls the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures" in independent Claims 1, 13 and 19 does set forth a definite limitation under 35 USC 112, second paragraph. When this limitation is considered, the Claims 1-19 are novel relative to Okai et al.

Okai et al. teaches etching techniques for providing a step or pole tip recession in a thin film magnetic head. The head includes an underlayer and a protective layer. As pointed out by the examiner, various layers are taught by Okai et al., but Okai et al. does not teach "a combination of Young's Modulus, a Poisson's ratio and a thickness such that the first restraint layer pulls the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures" as

presently claimed in Claims 1, 13 and 19. Okai et al. does not teach providing a restraint layer. Okai et al. does not teach any adjustment to a restraint layer thickness that takes into account Young's Modulus and Poisson's ratio. Okai et al. also does not teach pulling the transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures.

Claims 1-11, 13-19 as presently amended, recite a definite limitation that is not taught in Okai et al. Reconsideration and withdrawal of the rejection under 35 U.S.C. 102(b) over Okai et al. is therefore requested.

Response to Amendment

The Examiner responded to the applicant's last amendment by indicating that the word "if" in applicant's response renders applicant's arguments moot because the claims do not specifically set forth a structure to produce the claimed results. As argued above in connection with the Examiner's rejection under 35 U.S.C. 112, first and second paragraphs, the Claims do, in fact, set forth definite limitations, and these claims are supported by the specification over a range of embodiments commensurate with the breadth of the claims.

Concluding Remarks

Claims 1-19, as presently presented, define a head and method of manufacturing a head in which a restraint layer is provided and the restraint layer has a combination of Young's modulus, Poisson's ratio and thickness such that the restraint layer pulls a transducer back away from magnetic media to avoid contact with magnetic media at high head temperatures. When an embodiment of a head is produced in this manner, the head can be heated to a high temperature and observed to pull away from the magnetic media to avoid contact. When an embodiment of a head is produced in this manner, the material properties (Young's

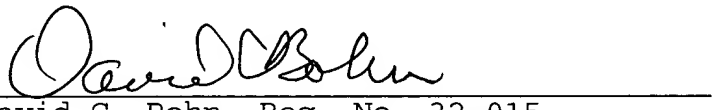
modulus, Poisson's ratio) and thicknesses of layers in the head can be modeled using thermal stress methods to ascertain that the restraint layer will cause the head to pull away from the magnetic media at high temperature. The limitations to the claims 1-19 are definite limitations that are readily observable in physical embodiments and that distinguish the claimed invention over the prior art cited.

The application appears to be in condition for allowance and favorable action is requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

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